

Daily GLOWBUGS

Digest: V1 #3

via AB4EL Web Digests @ SunSITE

Purpose: building and operating vacuum tube-based QRP rigs

[AB4EL Ham Radio Homepage @ SunSITE](#)

%%%% GlowBugs %%%%% GlowBugs %%%%% GlowBugs %%%%% GlowBugs %%%%%

Subject: glowbugs V1 #3

glowbugs

Thursday, April 10 1997

Volume 01 : Number 003

Date: Wed, 9 Apr 1997 13:43:46 -0400 (EDT)
From: EWoodman@aol.com
Subject: RE: AM Modulators, 160 metres, etc.

>From Shane Wilcox:

>Someone may have discussed this circuit earlier, but it's worth a second
> mention, I think. It's a 25 Watt, 160 metre, 4 tube AM rig with
> Pi-output, crystal control, and simple construction.

> It uses two 6C5's (or 6J5's) as crystal oscillator and 1st stage audio,
> and two 6L6's as RF power amplifier stage and 2nd stage audio/modulator.
> B+ is 400VDC and 200VDC.

In my search for a simple 160 AM rig, I keep going back to that circuit. I believe it's from a book "101 Ham Radio Projects" by Tom Kneitel and Bob Brown. Think it was published in the late 60's. It's full of all sorts of tube projects. There are several transmitters, modulators, and amps. One of the plate modulators dispenses with the modulation transformer or choke and uses one half of a 12AU7 in series with the B+ to the final (and doesn't use a carbon mic). Couldn't be simpler than that (if it works!). Maybe could mix and match and use the osc & final from the other circuit with the simple modulator. Even using the transmitter circuit as is shouldn't be too much of a problem. As Bobbi mentioned in an earlier posting, you can get carbon mic elements from old phones. I have some at home I've saved over the years. If we could find a workable sub for a carbon mic transformer and some 160M crystals, we'd be in business.

73 Eric K1YRV

Date: Wed, 9 Apr 1997 09:34:13 -1000
From: Jeffrey Herman <jeffreyh@hawaii.edu>
Subject: RE: AM Modulators, 160 metres, etc.

On Wed, 9 Apr 1997 EWoodman@aol.com wrote:

>

> In my search for a simple 160 AM rig, I keep going back to that circuit. I
> believe it's from a book "101 Ham Radio Projects" by Tom Kneitel and Bob
> Brown. Think it was published in the late 60's. It's full of all sorts of
> tube projects. There are several transmitters, modulators, and amps. One of

We've got this book in our campus library. I'll borrow it and anything you folks need referenced from it just ask.

Jeff KH2PZ

Date: Wed, 09 Apr 1997 16:15:37 -0400
From: pfy@intercall.net
Subject: recomendations for a Transmitter

Hi Guys,

I am new to this reflector and I was looking into a design W/schematic of

a one or two tube Transmitter (in the 40 - 90 watt range) that can be built by someone that is not an E.E. or a real Techy. I am also looking for recommendations on what books would make a good addition to a Ham Library and cover the basics of Tube transmitters and/or receivers. I am going to the FIDIM '97 & Dayton Hamvention so if anybody knows of a particular dealer they have dealt with who has books or boatanchors or Advice, can you give me his name and or where he is usually setup.

72&73 de
Paul F. Young, KC2AHB

pfy@intercall.net

Date: Wed, 9 Apr 1997 16:27:12 -0400 (EDT)
From: EWoodman@aol.com
Subject: Coil Forms

I'm sure this probably has come up before and maybe has been beaten to death already, but.....does anyone know where to get 5 pin coil forms? I have a set in my homebrew vfo 807 rig for 80M and would like to wind a set for 160 and 40. If not I'll just break up some old dead 807's and steal the bases.

73 Eric KALYRV

Date: Wed, 9 Apr 1997 14:54:02 -0600 (MDT)
From: toyboat@freenet.edmonton.ab.ca
Subject: RE: AM Modulators, 160 metres, etc.

On Wed, 9 Apr 1997 EWoodman@aol.com wrote:

> >From Shane Wilcox:
>
> >Someone may have discussed this circuit earlier, but it's worth a second
> > mention, I think. It's a 25 Watt, 160 metre, 4 tube AM rig with
> > Pi-output, crystal control, and simple construction.
>
> > It uses two 6C5's (or 6J5's) as crystal oscillator and 1st stage audio,
> > and two 6L6's as RF power amplifier stage and 2nd stage audio/modulator.
> > B+ is 400VDC and 200VDC.
>
> In my search for a simple 160 AM rig, I keep going back to that circuit. I
> believe it's from a book "101 Ham Radio Projects" by Tom Kneitel and Bob
> Brown. Think it was published in the late 60's.

Yup. It's simple and conventional (except for the modulation choke)
and uses domestic (for the 60's) Radio-TV parts. The PI output variable
caps are 100pF (plate side) and 250pF (antenna side). The PI inductor
is a 2" diameter winding of #20 enamelled, 75 turns, occupying 4 1/2"
length. The choke is a 20H/150mA power supply filter choke. There is
no audio interstage trafo in the modulator, just capacitor-resistor
coupling. Two 6C5's and two 6L6's in all. The MOPA section is a
great CW rig all on it's own. I think 7-pin mini 6C4's would sub for
the 6C5's (or 6J5's). 6AQ5's or 6V6's or 6F6's would work for the
RF amplifier with less B+ (presently 400VDC).

> It's full of all sorts of
> tube projects. There are several transmitters, modulators, and amps. One of
> the plate modulators dispenses with the modulation transformer or choke and
> uses one half of a 12AU7 in series with the B+ to the final (and doesn't use
> a carbon mic). Couldn't be simpler than that (if it works!). Maybe could mix
> and match and use the osc & final from the other circuit with the simple
> modulator. Even using the transmitter circuit as is shouldn't be too much of
> a problem. As Bobbi mentioned in an earlier posting, you can get carbon mic
> elements from old phones. I have some at home I've saved over the years. If
> we could find a workable sub for a carbon mic transformer and some 160M
> crystals, we'd be in business.

Someone suggested filament or audio output trafos in a recent posting.
Also, it was suggested to me to use a D-104 amplified mike, and to
dispense with the mike trafo entirely. (load resistor and coupling
capacitor)

Could also build a Radio Shack sand-state amplified mike with an element and mini-box.

> 73 Eric KALYRV

>

Date: Wed, 9 Apr 1997 21:37:54 +0000
From: Sandy W5TVW <ebjr@worldnet.att.net>
Subject: Re: Coil Forms

At 08:27 PM 4/9/97 +0000, you wrote:

>I' m sure this probably has come up before and maybe has been beaten to death
>already, but.....does anyone know where to get 5 pin coil forms? I have
>a set in my homebrew vfo 807 rig for 80M and would like to wind a set for 160
>and 40. If not I'll just break up some old dead 807's and steal the bases.

>
>73 Eric KALYRV
>

That's EXACTLY what happens to all my dead 807's! You will find that there is a plastic waste drain extension (white plastic) that you can get from your hardware store that the base will fit snugly inside of! Cut the tubing to shorter lengths with a coping saw with fine metal cutting blade. Cement on to the base with super glue (work fast!) The material is low loss as I have put it in the microwave for a couple of minutes and there is NO sign of heating of the plastic! The outside diameter is almost perfectly 1-1/2" which is "standard" in most old time projects. embossed logos/names/seams on the outside easily taken off with a flat file.

73,
E. V. Sandy Blaize, W5TVW
"Boat Anchors collected, restored, repaired, traded and used!"
417 Ridgewood Drive,
Metairie, LA., 70001
ebjr@worldnet.att.net
Looking for: 860 tubes, WL-460 tubes
Butternut HF2V antenna, G-R test gear.....*

Date: Wed, 9 Apr 1997 17:05:02 -0500 (CDT)
From: mjsilva@ix.netcom.com (michael silva)
Subject: Re: Heising modulation (was Re: AM Modulators, etc)

>>>Most interesting is the modulation transformer. It isn't. It's a
>>>common 20H/150mA power supply filter choke.
>>
>>Yep, this is Heising modulation. Both the audio modulator and the RF
>>PA current flow thru the choke,
>
> That's the way it is on the schematic.
>
>>and since the choke wants to keep the
>>current thru it constant, as the audio tube current goes up the PA
>>current goes down. Looks to me like the limitations are (a) The
>>modulator must be class A, and (b) the voltage and current to the PA
>>and modulator are the same, locking you into a modulator setpoint
^^^^^^
Hmmm, getting my work confused with my fun...
>>once you've picked your PA point, or vice-versa.
>
> How well does it work, within these limitations?

It worked well enough, from what I understand -- capable of 100% modulation. Somewhere I've got a design example for spec'ing the

modulation choke for a BCB transmitter, so the quality must have been high enough for that application. The biggest problem is that the audio amplifier, running class A, has to dissipate about five times the power that the PA dissipates.

73,
Mike, KK6GM

Date: Thu, 10 Apr 1997 01:58:52 +0000
From: Sandy W5TVW <ebjr@worldnet.att.net>
Subject: Trade: Books

I have the following books for trade, both in excellent condition:
CRC Handbook of Chemistry & Physics, 47th Edition. (1966-67) (Heavy!)
Radio Engineering-F.E.Terman, 3rd edition (1947)

Would like to trade for two of the following: ARRL Handbooks
1937-1940, 1946, or 1947 editions, or Frank C. Jones Radio Handbook 1937-1940 editions.

73,
E. V. Sandy Blaize, W5TVW
"Boat Anchors collected, restored, repaired, traded and used!"
417 Ridgewood Drive,
Metairie, LA., 70001
ebjr@worldnet.att.net
Looking for: 860 tubes, WL-460 tubes
Butternut HF2V antenna, G-R test gear.....*

Date: Wed, 9 Apr 1997 22:44:03 -0500 (EST)
From: "Roberta J. Barmore" <rbarmore@indy.net>
Subject: Cathode modulation, at last!

Hi!

Thanks to a couple of the guys who are better-organized, I was aimed at the right place to look for the simple cathode modulator--'55 ARRL HB being one of the places and happening to have one on the shelf.

Boy howdy is it *ever* simple! Looking at it and thinking, the 6Y6 (200mA per tube) or maybe 6W6 (at, say, 150mA per tube, it not having the oomph of the 'Y6) is probably the best choice--you want a tube with lower plate Z here, I 'spect, and that's where they differ from the rest of the beam-tube pack.

6Y6 is not scarce, elusive or gold-plated: AES sells honest, tube-shaped 6Y6Gs for all of \$2.90 per each and the style-less -GT flavor for \$3.40; for another few dimes, cautious souls can have New Improved -GA versions. I would not be surprised to learn our own CWest Tube Sales (hi, df!) has a few of these as well, at popular prices.

This critter essentially works by wiggling the cathode drop around; the effect is to move the grid voltage, since it's tied back to ground but effective grid volts are those between grid & cathode; this means that higher PA plate voltages will allow this system to more closely approach the kind of RF output power an "ideal" grid modulator would do. The little choke ("AC-DC type satisfactory," it says here, meaning Triad TC-7X, Hammond T-157J, or the one that fell off a junk chassis last week) exists (aided by three brave 'lytics) only to keep aforesaid cathode-voltage wiggles off the plates of the preamp tube and screen of the big tube.

As shown, the thing's got enough gain for a dynamic or crystal mic; drop one triode stage (it's using both halves of a 6SL7) and a carbon will do. (Ummm--everyone here knows you can run a dynamic speaker & transformer "backwards" as a mic, right? But don't throw your D-104 away, the trick ranks second to a good carbon).

I will join the throng, and offer copies for SASE. It's just one page, complete with photo and schematic. E-mail if you're interested.

Noticed somebody commenting that AM/BC rigs must've used Heising modulation, as he'd seen some big "modulation chokes" surplused from broadcast service. Well, not really--it's not efficient enough and all the conventional rigs from at least mid-30s on had a whacking great beast of a modulation transformer busily transforming modulation in the usual way.

But! They work a lot better (and my watch is happier) if there's not all that DC pouring through 'em, so a very standard trick was to hook up

It seems complicated but there is a method to the madness, and you can still find the paper clips; they just stick to the "modulation" choke and not the modulation transformer. :) All that iron tends to sing along with modulation, too--a weird effect 'til you get used to it.

Date: Thu, 10 Apr 1997 04:20:58 GMT
From: wrt@eskimo.com (Bill Turner)
Subject: Re: Heising modulation (was Re: AM Modulators, etc)

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>73,  
>Mike, KK6GM  
>  
>
```

73, Bill W7TI
wrt@eskimo.com

Commented elsewhere on what the modulation choke did in most AM/BC rigs, and won't repeat it. (Isn't what it sounds like but it's close).

Clever resistor-picking allows preventing overmodulation--but alas, it'll flat-top anyhow, so you get the same grief without being as loud. ;)

73,
--Bobbi

Date: Thu, 10 Apr 1997 04:48:05 +0000
From: "Brian Carling (Radio G3XLQ / AF4K)" <bry@mnsinc.com>
Subject: Re: <Hi Hi>

Welcome to the list Dexter!
Can you tell us a little more about what other items you stock in
addition to the tubes?
Or is it all there on the web site? I will have to take a look see!

Anyway, welcome aboard!

Bry

*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** <http://www.mnsinc.com/bry/> *

Date: Thu, 10 Apr 1997 04:57:59 +0000
From: "Brian Carling (Radio G3XLQ / AF4K)" <bry@mnsinc.com>
Subject: Re: carbon mic input transformers?

Only problem with this scheme is that it might produce sparks in the
modulator tube!

(oops it's not April 1 any more!)

On 8 Apr 97 at 23:32, William Hawkins spoke about Re: carbon mic
input transformers? and said:

> The plate-to-speaker transformer run backwards works just fine.
> That's the way old intercom units worked - the talk/listen switch
> switched the transformer to grid for talking and plate for listen.
>
> Ah, but you want it for a carbon mike, so it's got to handle DC in
> the speaker side. Well, if it doesn't work, try an automobile
> ignition coil. Handles DC, and has a _large_ turns ratio. Should
> have good high end response because a spark has a fast rise time.
>
> Regards,
> Bill Hawkins
>

*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
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Date: Thu, 10 Apr 1997 04:57:58 +0000
From: "Brian Carling (Radio G3XLQ / AF4K)" <bry@mnsinc.com>
Subject: Re: AM Modulators, 160 metres, etc.

Shane, this sounds like a GREAT project!

There is also a design for a simple 6T9 rig for 160m AM that is
now up on the web.

I like the looks of some of these more unusual xmtrs and cathode
modulation too!

Yes, I have built rigs using a choke for mod., but the only problem
is (according to G3UUR) that you can't really get 100% mod that way.

Does anyone else here corroborate G3UUR, Dave's complaint?

On 8 Apr 97 at 17:14, toyboat@freenet.edmonton.ab.c spoke about AM
Modulators, 160 metres, etc. and said:

>
> Hello All,
>
> All this talk about 160 metres, AM rigs, and simple modulators
> sort of started me digging into my pile of photocopies again.

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*****
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*** E-mail to: bry@mnsinc.com *
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*****
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I wish that there were more LOCALS on 160m AM in the daytime in the DC/Baltimore/Richmond/Philly area!

72.5 - Bry

On 7 Apr 97 at 14:58, Jeff Duntemann spoke about Crystal beat box for 160m work and said:

```
> Hi guys--
>
> Maybe this is just a wild idea. Maybe it could work.
>
> I have quite a number of out-of-band FT243 crystals, anywhere from 2
> Mhz up to 9 Mhz. It seems to me that if I hunted around I could
> find a fair few for which the difference would fall within 160m.
> What would be the simplest approach to a one-tube "oscillator" that
> actually beat two rocks against one another and peaked the
> difference frequency? I would guess there's a tube somewhere
> containing two triodes and a pentode. Two pierce oscillators and a
> mixer, then provide a peaking circuit to select the difference
> frequency from the mixer output.
>
> Is this nuts, or could it be done? I seem to recall that the very
> first synthesizers started out with schemes like this, and just got
> more and more elaborate.
>
> --73--
>
> --Jeff Duntemann KG7JF
> Scottsdale, Arizona
>
>
*****
*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** http://www.mnsinc.com/bry/ *
*****
```

Date: Thu, 10 Apr 1997 05:25:29 +0000
From: "Brian Carling (Radio G3XLQ / AF4K)" <bry@mnsinc.com>
Subject: RE: AM Modulators, 160 metres, etc.

On 9 Apr 97 at 13:43, EWoodman@aol.com spoke about RE: AM Modulators, 160 metres, etc. and said:
> If we could find a workable sub for a
> carbon mic transformer and some 160M crystals, we'd be in business.
>
> 73 Eric K1YRV

Eric & the gang - does anyone know if JAN or others are still able or willing to make any kind of crystals for 160m?

I imagine that they will for a fee, and NOT in FT243 holders.
Probably in those all-metal thangs!

Bry

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*****
*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** http://www.mnsinc.com/bry/ *
*****
```

Date: Thu, 10 Apr 1997 05:25:30 +0000
From: "Brian Carling (Radio G3XLQ / AF4K)" <bry@mnsinc.com>
Subject: Re: Crystal beat box for 160m work

This is a great suggestion by Jeff.
You DO occasionally see these show up at hamfests too.

I don't know whether you will still find many at the harbors,
but it's worth a try I suppose!

Most of them have those nice old air-wound coils in the finals.

On 7 Apr 97 at 14:37, Jeffrey Herman spoke about Re: Crystal beat

box for 160m work and said:

```
> Hey, I tried to start a thread about this last week, but no one took
> the bait. I had found two xtals whose sum landed in 30m.
>
> I agree with Bry, though - 160m is low enuf that a stable vfo could
> be constructed pretty easily.
>
> I hope you guys living near the ocean have searched your local
> harbor in search for an old 2 Mc AM marine band transceiver.. These
> were usually hybrids with a solid state rcvr and a couple tubes in
> the xmtr. Don Mertz on BA had one for sale, as have others. I can't
> think of an easier way to get on 160m AM than converting one of
> those rigs.
>
> In the mid 70s when that band went from AM to SSB, these radios
> could be found by the dozens in harbor and radio shop dumpsters.
>
> Place a want-ad in BA and .swap if you're interested in getting one.
>
> Jeff KH2PZ
>
>
*****
*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** http://www.mnsinc.com/bry/ *
*****
```

Date: Thu, 10 Apr 1997 05:25:31 +0000
From: "Brian Carling (Radio G3XLQ / AF4K)" <bry@mnsinc.com>
Subject: Re: Cathode Keying tubes with...

Has anyone on GB tried this?

It seems like adding 100 ohms in the cathode circuit of most tube
finals would grossly affect the performance! Adds cathode bias,
right??

On 8 Apr 97 at 12:28, Paul M Playford spoke about Re: Cathode Keying
tubes with... and said:

```
> I used to key cathode transmitters with a reed relay but the trick
> is to put a resistor in series with the relay contacts (so they
> would not stick). It's been a long time but I think it was 100 ohms,
> power rating as required. I probably have the relay yet but not the
> circuit it was in. It was an RTL logic iambic keyer - almost as old
> as I am.... de Paul ###
>
> *****
> ***** Paul Playford, W8AEF
> twisted pair: 602/580-0015 35639 North 3rd Street
> packet: W8AEF@KC7Y.AZ.NA Phoenix, AZ 85027-7405
> internet: aef8w@aztec.asu.edu
>
>
> *****
*** 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the great ham radio resources at: *
** http://www.mnsinc.com/bry/ *
*****
```

Date: Thu, 10 Apr 1997 09:24:59 -0400 (EDT)
From: "Walter L. Marshall" <wmarshall@CapAccess.org>
Subject: Home brew and Gernsback

Dear Glowbugs,
Just thought I'd mention the book by Gernsback called
Shortwave Manual of 1934. It has lots of regens, some
one and two tube transmitters, a piece about how to turn
that useless old neutrodyne (in your closet) into a AM
transmitter and other neat home brew projects. It also has
schematics for lots of radios including FB7, Comet, SW-5,
Scott, AGS, ect., ect., ect.
A valuable resource available from AES.

Walter

Date: Thu, 10 Apr 1997 09:26:08 -0400 (EDT)
From: EWoodman@aol.com
Subject: Re: Cathode Modulation

Bill Orr's Radio Handbook from 1956 also has a schematic for a real simple cathode modulator using 6L6's. You just parallel up enough of them to handle whatever current you need. Will provide copies if anyone is interested.

For reference only (it's SOLID state!) there's also a circuit using three of four transistors driving a big ole power transistor that goes in series with the cathode. Supposedly for cathode keyed rigs you just plug it into the key jack..

73 Eric K1YRV

Date: Thu, 10 Apr 1997 11:50:39 -0400
From: Roy Morgan <morgan@speckle.ncsl.nist.gov>
Subject: Re: Welcome Bobbi

At 10:07 AM 4/9/97 -0500, mike wrote:
>Bobbi wrote:
>
>>...Quick PS: saw Dexter Francis had done an introduction to the list;
>>do I need to do that, or do y'all know me from BA?
>
>Do introduce yourself Bobbi --
....
>her comments always provide plenty of chuckles *and* information.

I'll second that.

Good to have you aboard, Bobbi!

- -- Roy Morgan/Building 820, Room 562/Gaithersburg MD 20899
(National Institute of Standards and Technology)
301-975-3254 Fax: 301-948-6213 morgan@speckle.ncsl.nist.gov --

Date: Thu, 10 Apr 1997 13:38:35 -0400 (EDT)
From: rdkeys@csemail.cropsci.ncsu.edu
Subject: Anyone getting anything on the BA/GB QRG?

Anyone getting any QSO's on the BA/GB QRG's lately. I have heard a few and worked a few, but the traffic has been slow. I am sure it is the wonderful spring springing forth, right?

I am forcing myself to be there tonight and over the weekend, as often as I can make it so mebbe the ball will git rollin' agn.....

73/ZUT DE NA4G/Bob UP

p.s. On QRG 7050 QTR 0400Z, some of the CW list folks are thinking of getting together, for some lusty QRQ (per band conditions), and I would like to welcome any of the BA/GB crewe there too..... so dusts ye off yer bugges, an' grapples ye up yer tin cans atops yer noggins, etc..... an' puts them thar BA's an GB's ta use (after all, we needs ta shows da CWISTS wats real CW sending irons an' ether burners are, right?).

End of glowbugs V1 #3

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Created by **Steve Modena, AB4EL**
Comments and suggestions to **modena@SunSITE.unc.edu**
